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10/581,633	06/02/2006	Takayuki Shima	690151.402USPC	5399

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SEED INTELLECTUAL PROPERTY LAW GROUP PLLC
701 FIFTH AVE
SUITE 5400
SEATTLE, WA 98104

EXAMINER	
VERDERAME, ANNA L	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

# Office Action Summary	**Application No.** 10/581,633	**Applicant(s)** SHIMA ET AL.	
	Examiner ANNA L. VERDERAME	**Art Unit** 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _05 January 2009_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1,3,4,6,8,10 and 12-16_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1,3,4,6,8,10 and 12-16_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _02 June 2006_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The amendment filed on 01/05/2009 has been carefully considered. A response is presented below.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 3-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims recite a layer having an absorption coefficient(equivalent to an extinction coefficient) k equal to or larger than 0.75 and equal to or lower than 2.0 and further recite an absorption coefficient equal or lower than 1.0. These claims are indefinite because the claims fail to indicate at what wavelength of light these absorption coefficients are observed. Based on the evidence in table 1 of the applicant's specification an absorption coefficient in the desired range is obtained when x in PtO_x is equal to or larger than 1.0. The examiner suggests reciting the layer in terms of what x can be in PtO_x.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 3,6, 8, 10, and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by J. Kim, I. Wang, D. Yoon, I. Park, and D. Shin. Applied Physics Letters. 83 , 1701 (2003).

Kim et al. teaches an optical recording medium comprising a substrate of polycarbonate, a ZnS-SiO_2 layer, an $Ag_6In_{4.5}Sb_{60.8}Te_{28.7}$ layer, a ZnS-SiO_2 layer, a PtO_x layer, a ZnS-SiO_2, an $Ag_6In_{4.5}Sb_{60.8}Te_{28.7}$ layer and a ZnS-SiO_2 layer(figure 1). The ZnS-SiO_2 layer is $(ZnS)_{85}(SiO_2)_{15}$ like the applicant's. Each layer is formed by sputtering. The PtO_x layer is formed using a Pt_{100} target(page 1, column 1). The PtO_x layer is $PtO_{1.1}$(second page, column 1). The medium is recorded using a laser beam. Upon exposure the PtO_x layer decomposes resulting in a release of oxygen gas and the generation of Pt nanoparticles(page 2, first column). Release of gas and the subsequent volume change causes a deformation of the two upper and lower $Ag_6In_{4.5}Sb_{60.8}Te_{28.7}$ (page 2, column 2).

Kim et al. discloses a PtO_x layer wherein x is 1.1. Based on the disclosure in applicant's table 1, a $PtO_{1.1}$ layer will inherently have an absorption coefficient of between 1.69-1.98 at the wavelength used by the applicant.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been

obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 3,6,8,10,12-13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over J. Kim, I. Wang, D. Yoon, I. Park, and D. Shin. Applied Physics Letters. 83 , 1701 (2003) as applied above in view of T. Shima and J. Tominaga. Japanese Journal of Applied Physics. 42(2003) 3479.

Kim et al. discloses an optical recording medium containing a $PtO_{1.1}$ reaction layer, a light absorbing layer and a dielectric layer. The PtO_x layer is formed by reactive sputtering.

Shima et al. discloses a reactive sputtering method for forming PtO_x films. A Pt target having a purity of 99.9% is used. The target has a diameter of 76mm(7.6 cm). This gives an area for the target of $38cm^2$. Poweres of 100-200 W are disclosed. If a power in the range from 100-150W is used the power density will be less than $4W/cm^2$. a pressure of 0.5 Pa is used. Oxygen flow ratio is recited to be varied between 0 to 0.75 This includes a flow ratio of 10%(0.1) and larger(first column on page 3479).

Use of PtO_x films in optical discs is disclosed in the first column on page 3479.

Refractive indices and extinction coefficients for the $PtO_{1.1}$ film and a $PtO_{1.6}$ film formed according to this method are disclosed in the second column on page 3479 and continue to the first column of page 3480. The extinction coefficient for the $PtO_{1.1}$ film at 400 nm is 1.8 and is 1.9 at 630

nm. The extinction coefficient for the $PtO_{1.6}$ film is 1.6 at 400 nm and 1.3 at 630 nm.

It would have been obvious to one of ordinary skill in the art to use a $PtO_{1.1}$ film formed according to the method taught by Shima et al. in the medium taught by Kim et al. based on the use of a $PtO_{1.1}$ film by Kim et al. and based on the disclosure by Shima et al. to use PtO_x films in optical recording media.

Applicant presents arguments regarding the effects of sputtering conditions on the optical constants of the resultant film. The Shima reference teaches sputtering conditions in the range taught in the claims and shows that the resultant films have the desired optical properties.

5. Claims 13-14 rejected under 35 U.S.C. 103(a) as being unpatentable over J. Kim, I. Wang, D. Yoon, I. Park, and D. Shin. Applied Physics Letters. 83, 1701 (2003) as applied above and further in view of K.L. Saenger, C. Cabral, Jr., C. Lavoie, and S.M. Rossnagel. J. of Applied Physics. 86, 6084(1999).

Kim et al. discloses an optical recording medium containing a PtO_x reaction layer, a light absorbing layer and a dielectric layer. The PtO_x layer is formed by reactive sputtering.

Saenger et al. discloses a reactive sputtering method for forming a PtO_x film wherein a Pt target having a diameter of 30 cm is used and a power of 1,000 W is used. A pressure of 5-7mTorr is disclosed and an O_2 flow of between 0% to 75% of the total flow is disclosed.

The power density here is 1.41W/cm^2.

It would have been obvious to one of ordinary skill in the art to form the PtO_x film in the medium taught by Kim et al. using the method for forming PtO_x films disclosed by Saenger et al. with the reasonable expectation of success.

By using a lower power density a cheaper process is realized.

6. Claim 16 rejected under 35 U.S.C. 103(a) as being unpatentable over J. Kim, I. Wang, D. Yoon, I. Park, and D. Shin. Applied Physics Letters. 83 , 1701 (2003) in view of T. Shima and J. Tominaga. Japanese Journal of Applied Physics. 42(2003) 3479 as applied above and further in view of Salama. RF Sputtered Aluminum Oxide Films on Silicon. Toronto University Department of Electrical Engineering(1970).

Kim, I. Wang, D. Yoon, I. Park, and D. Shin. Applied Physics Letters. 83 , 1701 (2003) in view of T. Shima and J. Tominaga. Japanese Journal of Applied Physics. 42(2003) 3479 as applied above discloses formation of an oxide film of $PtO_{1.1}$ using a RF sputtering method. A power density of less than 4W/cm^2 is disclosed and the resulting films have the optical properties required by the instant claims.

Salama teaches the formation of an aluminum oxide film from an alumina target. Power density for the film formation is in the range of 0.5 to 3 W/cm^2 and the deposition rate is in the range from 20 to 80 angstroms/min.

It would have been obvious to have the deposition rate used to form the $PtO_{1.1}$ film be in the range of 20 to 80 angstroms/min based on the example of Salma et al. and with the reasonable expectation of success.

Salma et al. discloses using this film formation speed when a power density of less than 4W/cm^2 is used to form a metal oxide film from a metal target.

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over by J. Kim, I. Wang, D. Yoon, I. Park, and D. Shin. Applied Physics Letters. 83 , 1701 (2003) as applied above in view of Kim et al. US 7,390,547(Kim et al. ‘547).

Kim et al. discloses an optical recording medium containing a PtO_x reaction layer, a light absorbing layer and a dielectric layer. A $PtO_{1.1}$ reaction layer is exemplified.

Kim et al. '547 discloses a disc having an identical structure to that of Kim et al. The PtO_x layer is a layer where x is a positive number. This includes an example where x is 1.7.

It would have been obvious to one of ordinary skill in the art to modify the disc taught by Kim et al. by forming the reaction layer of PtO_x wherein x is a positive number such as 1.7 with the reasonable expectation of success. A PtO_x film will inherently meet the limitation of claim 4 when using a laser having a wavelength of ~630 nm based on the disclosure in applicant's table 1.

This rejection is made under the assumption that the absorption coefficients recited in the claims are measured at around 635 nm. Again the examiner recommends defining the films based on x in PtO_x. PtO_x films where x is 1.7 are shown by the applicant to have an absorption coefficient of less than 1.0 at 635 nm.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

-US 2004/0247891- teaches an optical recording medium comprising a substrate a first dielectric layer an alloy layer and a second dielectric layer(figure 1). The alloy layer 30 can be replaced with a PtO_x layer, an AgO_x layer a PdO_x layer or a WO_x layer(0045). When the metal oxide layer is heated the layer decomposes into a metal and releases oxygen. The release of gas causes an expansion which forms a pit

JP-09-296266- A thin film is formed using a power density of <1W/cm^2. The benefit of doing this is that less electric power is consumed.

-Yi Chiu et al., "Fabrication and nonlinear optical properties of nanoparticle silver oxide films", Journal of Applied Physics, vol. 94, no. 3, 1 August 2003, pages 1996-2001, XP002479469- The examiner notes that the sputtering powers used by the applicant are lower than those used in the references cited by the examiner. However, Yi Chiu et al. discussed the use of lower sputtering powers to avoid agglomeration in the results section on page 2. Sputtering powers of less than 50 W are recommended for sputtering AgO_x films.

Response to Arguments

Rejection of Claims 3, 4, 6, 8, 10 and 12 Under 35 U.S.C. § 102 By Kim –

The examiner believes the issues regarding the teachings of Kim et al. have been cleared up. Kim et al. discloses a structure like that recited by the applicant wherein a $PtO_{1.1}$ film is used. This film will inherently have an absorption coefficient in the range of 0.75-2.0 at a wavelength of about 630 nm as evidenced by applicant's table 1. The examiner has also pointed out that reciting the absorption coefficient without reciting a wavelength makes the claim indefinite. The examiner has suggested reciting the film on the basis of the value of x in the PtO_x film.

Rejection of Claims 13-16 Under 35 U.S.C. § 103 -

The examiner has added references which disclose the film forming conditions of claims 13-15 in relation to the formation of PtO_x films. With regard to claim 16, the examiner uses the Salma et al. reference which discloses using this film formation speed when a power density of less than $4W/cm^2$ is used to form a metal oxide film from a metal target. The references regarding the formation of PtO_x films teach the use of a power density of less than $4W/cm^2$ and less than $2W/cm^2$.

Technique for Designing, Forming and Estimating Optical Thin Films at a Production Site, by Takahashi (attached hereto, along with a short translated passage therefrom)-

The applicant has attached this reference to show that film formation conditions affect the optical constants of the resulting film. First, the examiner again notes that because the claims 3 and 4 do not recite the absorption coefficient in terms of a particular wavelength the claims are indefinite. Second, the examiner has rejected the claims 3, 3,6,8,10,12-13 and 15 under 35 U.S.C. 103(a) as being unpatentable over J. Kim, I. Wang, D. Yoon, I. Park, and D. Shin. Applied Physics Letters. 83 , 1701 (2003) as applied above in view of T. Shima and J. Tominaga. Japanese Journal of Applied Physics. 42(2003) 3479. Kim et al. disclose a $PtO_{1.1}$. The secondary reference discloses a method for forming a $PtO_{1.1}$ film which meets the limitations recited in the method claims 12-13 and 15. The resultant film has an extinction coefficient(absorption coefficient) in the range recited in the instant claims. Therefore a $PtO_{1.1}$ film formed by this method would inherently have an absorption coefficient in the range recited by the applicant. The limitation of claim 15 is met by the disclosure in Salma et al. reference which discloses using this film formation speed in the range recited by the applicant when a power density of less than $4W/cm^2$ is used to form a metal oxide film from a metal target. In the secondary reference, Shima et al., a when a power density of less than $4W/cm^2$ is used to form a metal oxide(PtO_x) film from a metal target(99.9% pure Pt target).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANNA L. VERDERAME whose telephone

number is (571)272-6420. The examiner can normally be reached on M-F 8A-4:30P.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on (571)272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark F. Huff/
Supervisory Patent Examiner, Art Unit 1795

/A. L. V./
Examiner, Art Unit 1795